Project Work Performance Analysis

from PMGT613

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7.4 - Deliverable: Team Case Study - Chapter 9

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Nightingale Project - A

Summary

Nightingale is the project name for the creation of a handheld electronic medical reference guide that is meant for use in emergency situations. Rassy Brown is the project manager, and her team has created a plan to ensure they have 30 functional devices at an upcoming trade show, MedCON, which starts 25 October. Competitors are also rumored to be developing a similar product and being able to present at MedCON would give the company significant market advantage. The company also made funding contingent upon development of a plan that would meet this critical deadline.

They developed an initial WBS with 30 activities, durations and predecessors provided by Larson and Gray (2014, p. 333). Additional technical details are provided in the Case Appendix in the textbook (p. 335).

Key Deliverables

- A schedule of activities with early and late times, the critical path, and estimated completion date.
- Prepare a memo to address the questions below.

Questions

1. Will the project as planned meet the October 25th deadline?

As currently planned, the project will not meet its target deadline, as it will not be complete until December 21, 2010. The excerpt from the project plan in Table 1shows the specific timeline for each activity.

Table 1: Initial Nightingale Project Plan

Unique ID	Name	Duration	Start	Finish	Successors	Total Slack
1	Architectural decisions	10 days	Mon 1/4/10	Fri 1/15/10	2,3,4	0 days
2	Internal specifications	20 days	Mon 1/18/10	Fri 2/12/10	5,6,7,8,9	20 days
3	External specifications	18 days	Mon 1/18/10	Wed 2/10/10	5,6,7,8,9	22 days
4	Feature specifications	15 days	Mon 1/18/10	Fri 2/5/10	10,11,12,13,14,15	0 days
5	Voice recognition	15 days	Mon 2/15/10	Fri 3/5/10	16,17	20 days
6	Case	4 days	Mon 2/15/10	Thu 2/18/10	16,17	31 days
7	Screen	2 days	Mon 2/15/10	Tue 2/16/10	16,17	33 days
8	Speaker output jacks	2 days	Mon 2/15/10	Tue 2/16/10	16,17	33 days
9	Tape mechanism	2 days	Mon 2/15/10	Tue 2/16/10	16,17	33 days
10	Database	40 days	Mon 2/8/10	Fri 4/2/10	16,17	0 days
11	Microphone/sound card	5 days	Mon 2/8/10	Fri 2/12/10	16,17	35 days
12	Pager	4 days	Mon 2/8/10	Thu 2/11/10	16,17	36 days
13	Barcode reader	3 days	Mon 2/8/10	Wed 2/10/10	16,17	37 days
14	Alarm clock	4 days	Mon 2/8/10	Thu 2/11/10	16,17	36 days
15	Computer I/O	5 days	Mon 2/8/10	Fri 2/12/10	16,17	35 days
16	Review design	10 days	Mon 4/5/10	Fri 4/16/10	18,19	0 days
17	Price components	5 days	Mon 4/5/10	Fri 4/9/10	18	5 days
18	Integration	15 days	Mon 4/19/10	Fri 5/7/10	20	0 days
19	Document design	35 days	Mon 4/19/10	Mon 6/7/10	23	30 days
20	Procure prototype components	20 days	Mon 5/10/10	Mon 6/7/10	21	0 days
21	Assemble prototypes	10 days	Tue 6/8/10	Mon 6/21/10	22	0 days
22	Lab test prototypes	20 days	Tue 6/22/10	Tue 7/20/10	23	0 days
23	Field test prototypes	20 days	Wed 7/21/10	Tue 8/17/10	24	0 days
24	Adjust design	20 days	Wed 8/18/10	Wed 9/15/10	25,26	0 days
25	Order stock parts	15 days	Thu 9/16/10	Wed 10/6/10	27FS+8 days	0 days
26	Order custom parts	2 days	Thu 9/16/10	Fri 9/17/10	27FS+13 days	8 days
27	Assemble first production unit	10 days	Tue 10/19/10	Mon 11/1/10	28	0 days
28	Test unit	10 days	Tue 11/2/10	Mon 11/15/10	29	0 days
29	Produce 30 units	15 days	Tue 11/16/10	Tue 12/7/10	30	0 days
30	Train sales representatives	10 days	Wed 12/8/10	Tue 12/21/10		0 days

2. What activities lie on the critical path?

The highlighted tasks in Table 1 are on the critical path due to their not having any slack time. The dominance of a single critical path as seen in Activities 1, 4, 10, and most Activities between 16 through 30 can be seen in those Activities having 0 slack.

3. How sensitive is this network?

The project network is not very sensitive. While the critical path has no room for timeline compression, nearly all of the non-critical tasks have a large amount of slack time. This will allow the team to compress the schedule of non-critical tasks without the risk of them becoming critical tasks because it has a single "dominant critical path" (p. 321). The large number of Activities from 2 through 15 and 19 with a large amount of slack support the assertion that this project network is insensitive.

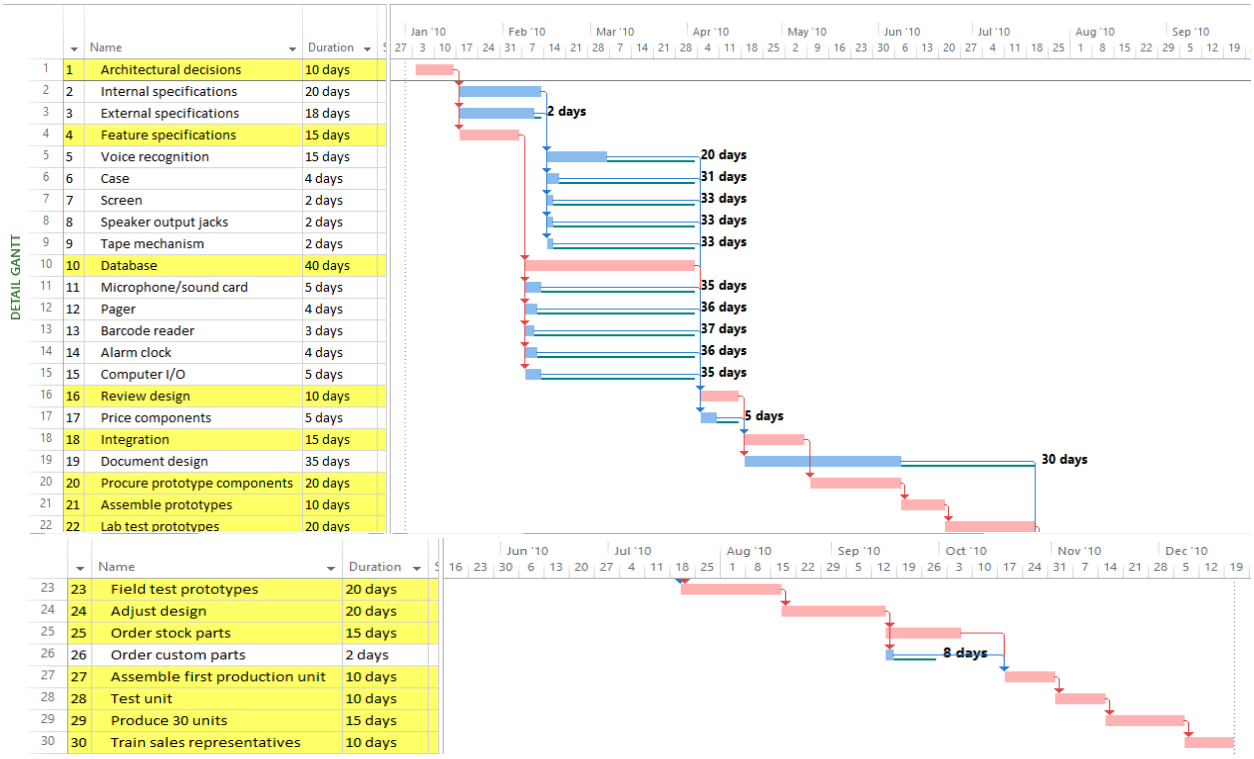

Figure 1: Original Project Timeline

Nightingale Project - B

Summary

The project team brainstormed ways to meet the 25 October deadline, finally deciding to look at overtime work and extra manpower. The PM had $100,000 that she was willing to spend on this, and they found the following activities could be reduced (Larson & Gray, 2014, p. 335).

- Voice recognition from 15 to 10 days, for $15,000.
- Database creation from 40 to 35 days for $35,000.
- Document design from 35 to 30 days for $25,000.
- External specifications from 18 to 12 days for $20,000.
- Procure prototype components from 20 to 15 days for $30,000.
- Order stock parts from 15 to 10 days for $20,000.

They also realized they could modify some tasks to have start-to-start relationships with lag with their predecessors. They agreed on the below changes:

- Document design 5 days after start of review design.
- Adjust design 15 days after start of field testing.
- Order stock parts 5 days after start of adjust design.
- Order custom parts 5 days after start of adjust design.
- Training sales representatives 5 days after start of test unit and could be completed 5 days after the completion of production of 30 units

Questions

1. Is it possible to meet the deadline?

Yes. Once the applicable start-to-start relationships were modified in the project plan, the new project completion date was reduced to finish in November. Then the potential time activity

crash reductions and costs could be evaluated. Reducing non-critical tasks do not affect the overall timeline, so only those activities on the critical path should be evaluated.

Adjusting the following tasks led to enough reductions to the overall project such that the 30 units would be completed on 25 October, at a cost of only $85,000:

- Activity 4: Creation of a database – reduce by 5 days at a cost of $35,000.
- Activity 20: Procure prototype components – reduce by 5 days at a cost of $30,000.
- Activity 25: Order stock parts – reduce by 5 days at a cost of $20,000.

2. If so, how would you change the original schedule (part A) and why? Assess the relative impact of crashing activities versus introducing lags to shorten project duration.

As discussed in question 1 above, all of the activity start relationship modifications can be done at no added cost to the project. These project modifications more effectively manage the times required and starting those tasks at the most effective point in the overall project. The crashing of certain activities has to be analyzed though to ensure that the money is well spent. Only reducing activities on the critical path have the desired effect on the schedule and should be considered. However lags and crashing of other activities could change the critical path potentially, so that should be monitored as well. The project plan modifications and shown in Table 2 below with both the changes to the predecessor relationships and durations highlighted:

Table 2: Project Activity Modifications

Unique ID	Name	Duration	Start	Finish	Predecessors
1	Architectural decisions	10 days	Mon 1/4/10	Fri 1/15/10	
2	Internal specifications	20 days	Mon 1/18/10	Fri 2/12/10	1
3	External specifications	18 days	Mon 1/18/10	Wed 2/10/10	1
4	Feature specifications	15 days	Mon 1/18/10	Fri 2/5/10	1
5	Voice recognition	15 days	Mon 2/15/10	Fri 3/5/10	2,3
6	Case	4 days	Mon 2/15/10	Thu 2/18/10	2,3
7	Screen	2 days	Mon 2/15/10	Tue 2/16/10	2,3
8	Speaker output jacks	2 days	Mon 2/15/10	Tue 2/16/10	2,3
9	Tape mechanism	2 days	Mon 2/15/10	Tue 2/16/10	2,3

10	Database	35 days	Mon 2/8/10	Fri 3/26/10	4
11	Microphone/sound card	5 days	Mon 2/8/10	Fri 2/12/10	4
12	Pager	4 days	Mon 2/8/10	Thu 2/11/10	4
13	Barcode reader	3 days	Mon 2/8/10	Wed 2/10/10	4
14	Alarm clock	4 days	Mon 2/8/10	Thu 2/11/10	4
15	Computer I/O	5 days	Mon 2/8/10	Fri 2/12/10	4
16	Review design	10 days	Mon 3/29/10	Fri 4/9/10	5,6,7,8,9,10,11,12,13,14,15
17	Price components	5 days	Mon 3/29/10	Fri 4/2/10	5,6,7,8,9,10,11,12,13,14,15
18	Integration	15 days	Mon 4/12/10	Fri 4/30/10	16,17
19	Document design	35 days	Mon 4/5/10	Fri 5/21/10	16SS+5 days
20	Procure prototype components	15 days	Mon 5/3/10	Fri 5/21/10	18
21	Assemble prototypes	10 days	Mon 5/24/10	Mon 6/7/10	20
22	Lab test prototypes	20 days	Tue 6/8/10	Tue 7/6/10	21
23	Field test prototypes	20 days	Wed 7/7/10	Tue 8/3/10	19,22
24	Adjust design	20 days	Wed 7/28/10	Tue 8/24/10	23SS+15 days
25	Order stock parts	10 days	Wed 8/4/10	Tue 8/17/10	24SS+5 days
26	Order custom parts	2 days	Wed 8/4/10	Thu 8/5/10	24SS+5 days
27	Assemble first production unit	10 days	Mon 8/30/10	Mon 9/13/10	25FS+8 days,26FS+13 days
28	Test unit	10 days	Tue 9/14/10	Mon 9/27/10	27
29	Produce 30 units	15 days	Tue 9/28/10	Mon 10/18/10	28
30	Train sales representatives	10 days	Tue 10/12/10	Mon 10/25/10	28SS+5 days,29FF+5 days

3. What would the new schedule look like?

The new shedule shown in shows the project will now be completed on the target date of October 25th, 2010. All of the modifications cited above are incorporated and none of the previously non-critical activities were at risk of becoming critical as a result of thes changes. This is evidence that the project network was insentitive as stated earlier.

4. What other factors should be considered before finalizing the schedule?

Since there is a small amount of money left that the PM was willing to spend on schedule crashing, perhaps something else can be done with some of the critical tasks. For example, the database creation is a big cause of extending the timeline out, and it is significantly longer than

all other tasks required before the design review. Perhaps if there were additional ways they could reduce that activity, more time could be saved. This would also help some management reserve for schedule at the end of the project since right now there is no slack before the trade show.

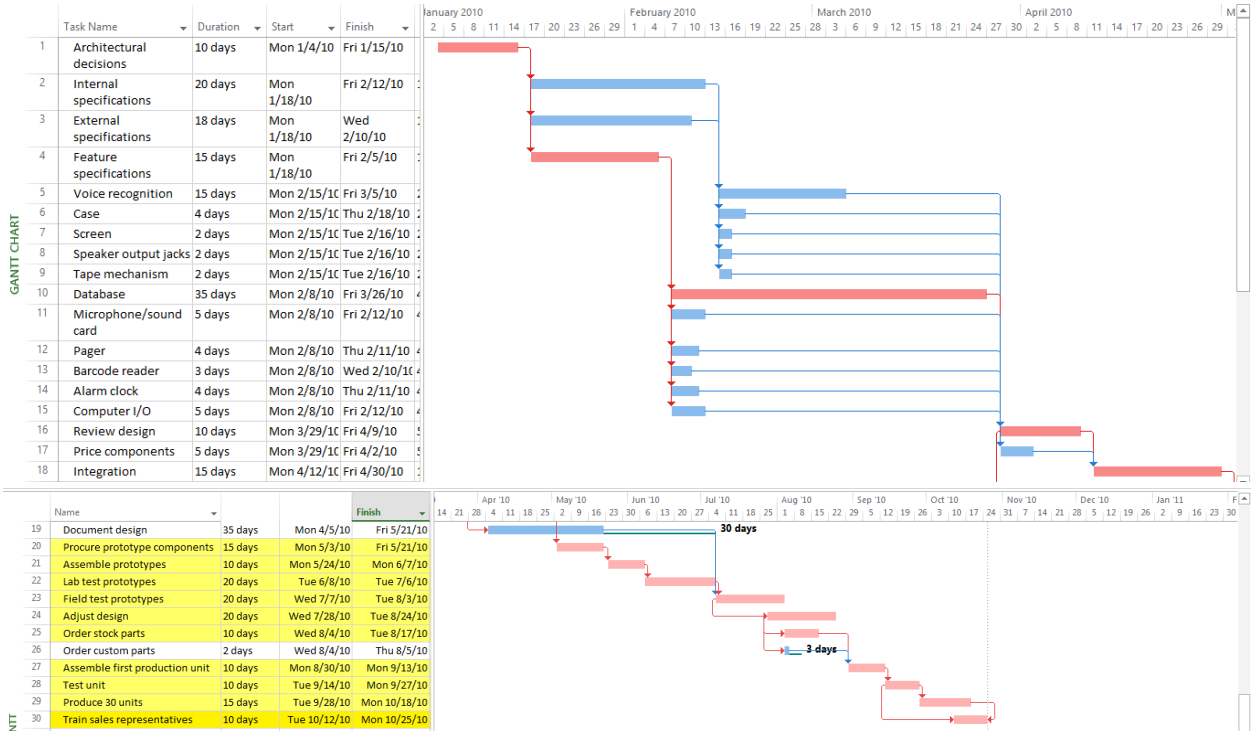

Figure 2: Modified Project Plan

References

Gambrel, B. (Ed.). (2013). *Microsoft official academic course: Microsoft Project 2013.* Hoboken, NJ: Wiley & Sons.

Larson, E. W., & Gray, C. F. (2014). *Project management: The managerial process.* (6th ed.). New York, NY: McGraw-Hill Education.

Project Management International. (2013). *A guide to the project management body of knowledge* (5th ed.). Newtown Square, PA: Project Management Institute.